AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A gallium nitride compound semiconductor multilayer structure comprising a substrate, and an n-type layer, an active layer, and a p-type layer formed on the substrate, a negative electrode and a positive electrode being provided on the n-type layer and the p-type layer, respectively, the active layer being sandwiched by the n-type layer and the p-type layer, the active layer is a single quantum well structure formed of a single well layer or comprises at least one well layer in a multiple quantum well structure, the active layer comprising a thick portion and a thin portion, and the thick portion being disposed irregularly within a single well layer, wherein the active layer has a flat lower surface (on the substrate side) and an uneven upper surface so as to form the thick portion and the thin portion.

2. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the active layer contains In.

3. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 2, wherein the upper surface of the active layer is covered with a thin layer not containing In.

4. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the thick portion has a thickness of 15 Å to 50 Å.

5. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 4, wherein the thick portion has a thickness of 15 Å to 30 Å.

6. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the thick portion has an arithmetic mean width, as measured in a cross-section of the multilayer structure, of 10 nm or more.

7. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 6, wherein the thick portion has a width, as measured in a cross-section of the multilayer structure, of 100 nm or more.

8. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the thin portion has a thickness of 15 Å or less.

9. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the thin portion has an arithmetic mean width, as measured in a cross-section of the multilayer structure, of 100 nm or less.

10. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 9, wherein the thin portion has a width, as measured in a cross-section of the multilayer structure, of 50 nm or less.

11. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the difference in thickness between the thick portion and the thin portion falls within a range of 10 Å to 30 Å.

12. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the thick portion has an area accounting for 30% or more the entire area of the active layer.

13. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 12, wherein the thick portion has an area accounting for 50% or more the entire area of the active layer.

14. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 1, wherein the active layer is at least one well layer in a multiple quantum well structure.

15. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 14, wherein the multiple quantum well structure is repeatedly stacked 3 to 10 times.

16. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 15, wherein the multiple quantum well structure is repeatedly stacked 3 to 6 times.

17. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 14, wherein the multiple quantum well structure has a barrier layer formed of a gallium nitride compound semiconductor selected from GaN, AlGaN, and InGaN which has an In content lower than that of the InGaN forming the active layer.

18. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 17, wherein the barrier layer is formed of GaN.

19. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 17, wherein the barrier layer has a thickness of 70 Å to 500 Å.

20. (previously presented): The gallium nitride compound semiconductor multilayer structure according to claim 19, wherein the barrier layer has a thickness of 160 Å or more.

21. (previously presented): The gallium nitride compound semiconductor light-emitting device, wherein the device has a negative electrode and a positive electrode, the negative electrode and the positive electrode being provided on the n-type layer and the p-type

layer of a gallium nitride compound semiconductor multilayer structure according to claim 1, respectively.

22. (previously presented): The gallium nitride compound semiconductor light-emitting device according to claim 21, which has a flip-chip-type device structure.

23. (previously presented): The gallium nitride compound semiconductor light-emitting device according to claim 22, wherein the positive electrode has a reflection-type structure.

24.-37. (canceled).

38. (new): A method for producing a gallium nitride compound semiconductor multilayer structure comprising a substrate, and an n-type layer, an active layer, and a p-type layer formed on the substrate, a negative electrode and a positive electrode being provided on the n-type layer and the p-type layer, respectively, the active layer being sandwiched by the n-type layer and the p-type layer, the active layer is a single quantum well structure formed of a single well layer or comprises at least one well layer in a multiple quantum well structure, the active layer comprising a thick portion and a thin portion, and the thick portion being disposed irregularly within a single well layer, wherein the active layer has a flat lower surface (on the substrate side) and an uneven upper surface so as to form the thick portion and the thin portion, wherein the method comprises a step of forming the active layer, which step includes a step of growing a gallium nitride compound semiconductor and a step of decomposing or sublimating a portion of the gallium nitride compound semiconductor.

39. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 38, wherein the active layer contains In.

40. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 39, wherein the active layer is grown by continuously supplying a nitrogen source and a Group III metal source containing In and Ga and, subsequently, a thin layer not containing In is formed on a surface of the active layer by stopping the feeding of the In metal source.

41. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 38, wherein the step of growing is performed at a substrate temperature of T1 and the step of decomposing or sublimating is performed at a substrate temperature of T2, wherein T1 and T2 satisfy the relationship: $T1 \leq T2$.

42. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 41, wherein T1 falls within a range of 650 to 900°C.

43. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 42, wherein T2 falls within a range of 700 to 1,000°C.

44. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 38, wherein the step of growing is performed in an atmosphere containing a nitrogen source and a Group III metal source and the step of decomposing or sublimating is performed in an atmosphere containing a nitrogen source but not containing a Group III metal source.

45. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 44, wherein the step of decomposing or sublimating is performed while the substrate temperature T1 is elevated to T2.

46. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 45, wherein the substrate temperature T1 is elevated to T2 at a temperature elevation rate of 1°C/min to 100°C/min.

47. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 46, wherein the temperature elevation rate is 5°C/min to 50°C/min.

48. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 45, wherein the substrate temperature T1 is elevated to T2 over 30 seconds to 10 minutes.

49. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 48, wherein the substrate temperature T1 is elevated to T2 over one minute to five minutes.

50. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 41, wherein the active layer is at least one well layer in a multiple quantum well structure, and at least one barrier layer in the multiple quantum well structure is grown at T2, followed by lowering the substrate temperature to T3 at which further growth is performed.

51. (new): The method for producing a gallium nitride compound semiconductor multilayer structure according to claim 50, wherein T3 is equal to T1.